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National Parks.

LAST week we spoke of the necessity of some immediate action to save a remarkable grove of Giant Sequoias in Tulare County, California, and since the paper was published we have received a petition addressed to Secretary Noble, in which the facts we published are set forth with the prayer that the land may be withheld from entry until Congress has an opportunity to act upon the matter. The petitioners desire that Congress shall set apart this particular group of Big Trees, which are scattered over some four or five square miles, together with certain other outlying groups, as a "national park," to be devoted to public use forever. There is little doubt that the sentiment of the country would favor such a consummation. The Mariposa Grove, it is true, has been reserved, but this is comparatively small and isolated. The other forests of these Big Trees are disappearing with frightful rapidity. The Fresno trees are already condemned, and the mills are running now which will soon convert them into lumber. It is lumber, too, which the speculators want who have recently obtained possession of much of the Sequoia lands in Tulare County, and, of course, these trees must go. It is to be remembered, too, as John Muir points out in the current number of the *Century*, that more trees are wasted in these mill operations than those which are actually made use of, because, after the manageable trees have been cut and blasted and sawed, fire is let loose among the refuse to clear the ground, so that the trees which were too large to be converted into profitable lumber are destroyed as well as the saplings and seedlings. As we have often said before, the vast herds of sheep in these mountain pastures create a desolation even greater than that caused by the axe, and here, too, the fires which are kindled to improve the pastures sweep through the forests from end to end, and these groves of mammoth trees will soon be nothing but a memory unless some legal protection is thrown about them. It must be admitted that our experience with so-called "national parks" hitherto has not been encouraging. One has only to read the defense of the management of the Yosemite Park by the Governor of California to be convinced that its scenery has been mutilated and defaced almost beyond the power of restoration. But if any additional evidence was necessary the illustrations of Mr. Muir's article above referred to will furnish it. Here we see soft expanses of meadow turned into plow-land and the stumps still standing and still sound of some 2,000 thrifty young trees which have been cut away for some unknown purpose. Besides this total destruction of the trees we see beautiful groups of young conifers disfigured into the likeness of German toy-trees by having all their lower branches ruthlessly lopped away. There are rising murmurs of complaint to the same effect regarding the Yellowstone Park, and even the Niagara Reservation, which is in the heart of a civilized country and embraces so small a space that it can all be easily and constantly inspected, is only kept from being hopelessly vulgarized by constant watchfulness on the part of the people.

It is perhaps a misfortune that all lands set apart for public use should be designated by the name of "park," a word which suggests to most people some attempt at gardening or decoration. This proposed reservation will be primarily a forest and it should be so designated. Certainly it should not be called by a name which has come to be adopted as a common title for fair grounds, race tracks, play grounds, city squares, groups of adjacent private residences, and many other things equally incongruous. It is plain that any attempt to dress out a Sequoia forest with ornamental planting or floral finery would be ridiculous. What is needed in such a place is the preservation forever of the essential natural features of the scenery. The motto of the association whose work brought about the law for the Niagara Reservation was "To preserve the Scenery of Niagara." This, in a broad sense, should be the aim in administrating the Yosemite, the Yellowstone, and the Tulare Forest. No other justification for taking possession of these places in the name of the people is needed than an honest effort to preserve, as we have inherited them, these treasures of beauty and sublimity, of majesty and mystery, of grandeur and of grace, and to transmit them unimpaired to our posterity.

But while everything like artificial embellishment should be avoided in the preparation and management of these representative pieces of scenery, there is an opposite danger to be shunned. It is too often assumed that because a place is to be treated naturally, it can therefore be successfully administrated by men who have no special aptitude or training for such work. It is admitted that study should be given to a work of landscape art in which artificial arrangement and construction prevail, but it is taken for granted, on the other hand, where a simple and natural treatment is desired, that no thought or study is demanded. Therefore it happens that Governors and others who have the appointing of executive officers for the administration of Reservations like the Yosemite feel that they do their whole duty if they only select men of energy and honesty and business ability. But the fact is that the problem of preserving as nearly as possible the original and natural expression of a given piece of scenery is quite as difficult a one as the creation of a landscape picture out of the raw material. It is a general truth that, in every work which makes appeal to the æsthetic sense, simplicity of conception and of treatment is an essential condition of the highest success and is the crowning proof of genius. And in this special case it is plain that only an artist of the first rank is able to decide what are the essential and enduring features in a given passage of scenery and what are merely temporary and adventitious. It will not be enough to let the trees alone in the Tulare Forest. It must be adapted to human convenience. Roads must be prepared and other arrangements made so that it can be seen, and seen by great numbers of visitors at all seasons, and to the best advantage always. And these arrangements must be made not for to-day, but for all time, and during this time the forest will be constantly changing. Trees will grow and trees will die, and it will require the exercise of the keenest foresight to make a preparation which will best meet these

ever shifting conditions so that the forest will be preserved and maintained, and at the same time prepared for use without showing the touch of man. Work must be done, but it must be work which conserves without blemishing, and work which will make all these forest-treasures available without defacing one of them. Such a task requires as much ability as the highest creative or constructive work of the landscape-gardener. No one is equal to it who does not possess the faculty of the true artist and who has not learned to have a reverence as well as a love for Nature.

Botany at the University of Montpellier.

THE readers of Garden and Forest have already read accounts of the celebration in May of the six hundredth anniversary of the foundation of the University of Montpellier. To botanists this celebration had a special significance, for, since the foundation of the Botanic Garden by Henry IV. in 1593, and the installation of Richer de Belleval as Professor of Botany, the picturesque university town has been the home of a large number of illustrious botanists. In 1889 there was established at the university an *Institut de Botanique*, and, in a very interesting pamphlet, Professor Charles Flahault gives an account of the buildings erected and of the courses of instruction, together with short biographical notices of the prominent persons who have either occupied the chair of botany or pursued their botanical studies at Montpellier. The list is long and includes an astonishing number of illustrious botanists. Amongst them are the names of Rondelet, Clusius, Lobelius, Bauhin, Magnol, Tournefort, A. de Jussieu, Draparnaud, A. P. De Candolle, Delile, Duval, Bentham, Moquin-Tandon, Charles Martins and others well known in the history of botany. Besides those mentioned are other names known rather in the literary than the scientific world. Rabelais, the pupil and friend of Rondelet, who introduced his master under the name of Rondibilis in "Pantagruel," we are told was not a very zealous pupil, and Rousseau we are informed was more occupied with his health than his studies while at Montpellier in 1737.

The Institut occupies three principal buildings in the Botanic Garden: the Pavillon Richer de Belleval, including the rooms devoted to instruction; the Pavillon Magnol to research in anatomy and physiology; and the Pavillon de Candolle containing the herbarium, library and the office of the Director of the garden. The equipment for general instruction is liberal, but we notice with special pleasure the ample provision made for research and the facilities offered to those who wish to consult the very valuable collections belonging to the University. One room in the Pavillon Magnol is reserved for visiting botanists who wish to pursue botanical investigation. It is to be hoped that the day is not far distant when, in America, it will be generally recognized that the botanical resources of our universities should be so administered that those who wish to pursue research will find abundant opportunity and encouragement. The plan adopted at Montpellier deserves careful study and should commend itself to all American universities as a model to be followed by them as far as their means permit.

Much of the wastefulness in the methods of cutting timber now in use in this country is a matter of habit, a survival from the times when the chief need was to destroy timber as fast as possible in order to clear the ground for cultivation. It is easier to go on in the same way than to change, and much timber is now wasted that would yield a profit to the owner if it were rightly handled. Many lumbermen recognize the need of change in the direction of greater care in cutting and in the handling of timber lands, but they leave the work of beginning the use of new methods to those who are to come after them. It is often asserted that regard for their own interests will lead lumbermen and owners of timber lands to guard against waste whenever such care becomes necessary. But it is necessary now. It would be good economy, would be profitable in all cases in which reasonable care is lacking. The fact is, as all competent observers of human action are aware, that men in general are very far from being controlled by an intelligent regard for their own interests. Enlightened self-interest is an entirely adequate principle for the guidance of human conduct, but to bring men to accept it, and to act upon it, has always been a matter of great difficulty. It requires much discussion, reiterated precept, and often the sharp lessons of painful experience, to persuade men to do what is most profitable to themselves, to adopt such courses of action as will yield them the greatest benefits.

The need for improvement does not usually become plain to everybody at the same time. It is more apt to be perceived by a few at first, and earnest and long-continued effort on their part is often required to awaken others to a sense of its importance or necessity. Not only are men long indifferent to what they afterward recognize as necessary and fortunate for themselves, but they strenuously resist the effort to bring about changes from which they are to receive the principal advantages. This experience is always being repeated. It is a constant feature of human life and action. It is all exemplified in the matter of methods of forest-management in this country. Greater care in avoiding and preventing waste would be profitable now. The time has already come to practice it. Lumbermen can make more money by it this year and the next than they do by the methods now too commonly used. Such reasonable care would increase the value of their timberlands so that they would sell for more or be more valuable property as an inheritance for their children. No matter how abundant our timber supply may be, or how long it is likely to last, it would be wise and profitable to avoid wasteful methods of cutting timber and of handling timberlands. It is only sensible and practical economy to employ all available means and conditions to increase the productiveness of wooded lands, and to make the local timber supply everywhere last as long as possible.

Native Shrubs of California.—IV.

Lavatera assurgentiflora, Kellogg (Proc. Calif. Acad., i., 14). The number of things I shall have to say about this Lavatera will be out of proportion to its merits as an ornamental shrub; for these are not great. A stout and heavy-looking bush or small tree, with a not unsightly, angular, Maple-like foliage, and a profusion of rich red flowers hung on long and slender stalklets from the axils of the leaves, it is sufficiently showy to have been cultivated everywhere throughout the maritime parts of California, apparently from the early days of the Spanish settlements.

Unquestionably indigenous to Californian territory, it is never seen growing wild except around old dwellings or near gardens; and, since along with the Acacias, Eucalyptus and other Australian trees and shrubs, it comes into flower soon after the winter solstice, a stranger would take it for an exotic from the southern hemisphere. Such was the impression it gave me when I first saw it, blooming beautifully in midwinter, many years ago. It is one of a considerable number of trees and shrubs which are found wild nowhere else in the world except upon two or three rocky islets which, although politically a part of California, are barely visible above the horizon as one looks out to the seaward, on a clear day, from Santa Barbara or San Pedro.

When Dr. Kellogg named and published the species as new to science, he put upon record a tradition that the seeds of it had been brought in the first place from the island of Anacapa. It does not appear that any botanist or amateur had authenticated this supposed habitat; nor has such authentication ever yet been made. On the contrary, several intelligent men who, although not botanists, know the Lavatera very well, and who have been on Anacapa repeatedly, declare that it does not grow there. I nevertheless suspect that if ever a zealous and careful botanist shall visit Anacapa he may find it lurking among the half-cavernous niches of the basaltic columns not far above the water's edge. It should be sought in some such place, and not on the dry and exposed summit or sides of the island, where other shrubs grow.

The exact type common in cultivation all up and down western California has, within a few years, been found on one or two maritime rocks smaller than Anacapa and lying near the large island of Santa Catalina. But the principal native locality for the species is the island of San Miguel, the northernmost member of the Santa Barbara group, and an island two or three miles in extent. But the shrub of San Miguel differs in several ways, and quite notably, from that which is in cultivation, and which came from the more southerly station. It is of more robust and compact growth, making a shapely and handsome small tree; its leaves are much larger, its flowers of a deeper red, and the stellate pubescence, prevalent in the malvaceous family, is far more abundant.

On my return from San Miguel Island in 1886, I felt some suspicions that the Lavatera might be proven indigenous to the peninsula of San Francisco. Although 300 miles of sea intervene, the soil and climate of the two localities are much alike. I had seen it flourishing in abundance at the Cliff House in wild looking places among the bluffs overhanging the sea, and also, as I thought, in places among the sand hills rather remote from where it was likely to have been planted. I had also been informed by older members of the California Academy that it had been still more common years ago than now at various places back of San Francisco, where there were no settlements. But having revisited and carefully inspected every locality there, I became convinced that it is not indigenous on any part of the peninsula of San Francisco. The largest trees, and those appearing as if they might be twenty years old or more, are either under cultivation and where they were planted by the hand of man, or else in the vicinity of old dwellings. It is very commonly planted in rows along the western and northern sides of market-gardens, where it speedily grows into an effective hedge, which, while not dense enough to be impervious to animals, serves a useful purpose in breaking the force of the cold sea winds which prevail from those points of the compass during the summer.

The leaves and twigs, abounding in mucilage, are a nutritious and wholesome food for sheep and cattle, which are very fond of them. On San Miguel the only trees surviving in 1886 were certain large-sized ones, which bore their branches above the reach of any ruminant. The smaller ones were dead or moribund through having been too closely browsed by the sheep.

The individual flower of this species is really very beautiful; and it is only because the branches are a little coarse and unwieldy, and the foliage apt to conceal the richest profusion of the flowers, that the shrub as a whole is not highly attractive. The petals, an inch long or more, arranged as in the Hollyhock or Mallow, are of a peculiar deep pink color, veined with almost a carmine. On first unfolding they spread apart only so far as to form a bell-shaped corolla, afterward becoming abruptly deflexed from a little above the base, so that the body of the corolla is inside out; and since the flowers are pendulous, each on a long, slender stalklet, this inversion of the corolla gives the fullest exposure of the stamens and pistils to the favoring agency of the winds. The seeds, which are under all circumstances matured in abundance, germinate freely where they fall; and so the species spreads wherever planted, if not too far from the sea. In the interior of the state I have never seen it.

Although none of the other three North American species of this genus are properly Californian, inasmuch as they inhabit each an island of its own off the coast of the Mexican territory of Lower California, still they must be mentioned in connection with *L. assurgentiflora*, and I name first of the three *L. venosa*, confined to the little island of San Benito, the position of which is about 500 miles south of the islets occupied by the best known species. And while an intermediate islet has yielded a third, and a very different species, the two which belong to those widely separated extremes of our Lavatera archipelago, although so distinct that no botanist having seen them both will be likely to think of them as very closely related, they are far more like each other than either one is like either of the two whose geographical range is intermediate. This is another strange fact to be noted in connection with this capricious sorosis of sea-rock shrubs.

L. venosa has about the same foliage as that of *L. assurgentiflora*, though of a deeper green, with even less pubescence. Its flowers are also hung each upon a long and slender peduncle, but they are rather more than twice as large, commonly measuring three inches from tip to tip of the widely spreading petals. The color of the petals is mainly white below the middle, of a rich violet above, about five heavy veins of the violet streaking the otherwise white portion of the organ down to its base. The leaves being rather smaller than those of *L. assurgentiflora*, and the flowers twice as large, it is far more showy; and the individual flowers are greatly admired by the few who have seen them. Two years ago some small seedlings were brought to me from San Benito by a friendly naval officer whom I had asked to do me the favor, and the one surviving individual of the lot, now blooming luxuriantly at Berkeley, is doubtless the only one alive upon this or any other continent. Its mode of growth is altogether peculiar. There is always an erect main stem, from which the branches take a descending instead of an ascending or even horizontal direction, so that the trunk is ultimately concealed by the leafy and flowery branches whose tips reach the ground and then turn up or spread or straggle about. My bush having been continuously in flower since the beginning of February, promises now a crop of seeds. It seemed to endure the slight frosts of our "Bay region" about as well as does its familiar ally, whose native station is far more northerly than its own.

L. insularis, of the Coronado Island, seven miles off the coast of northern Lower California, and *L. occidentalis*, of Guadalupe Island, are more robust shrubs than either of the aforenamed, and their stout branches, short and firmly ascending, combine to form a low, umbrella-like head; their large greenish and violet-streaked corollas are strictly bell-shaped, inserted on short peduncles, and are mostly concealed by the foliage. The essential distinction between these two, as species, lies in the foliage, and is one which an amateur might overlook, although the eye of a practical botanist would quickly both catch the marked difference and recognize its specific importance. In *L. insularis* the five or seven lobes of the leaf radiate all around the end of the leaf-stalk, giving quite a star-shaped outline to the whole. In *L. occidentalis* the lobes all incline forward in such wise that the leaf is rendered digitate or hand-shaped. These two species, each restricted to its own island, and the two islands more than 200 miles apart, form a group by themselves, both having gray-green foliage, short-stalked violet and green flowers, with corollas broad and open even to the base, but not recurved or reflexed; both also have that compact habit which, making display of the handsome pointed foliage, compensates for the concealment of the flowers.

It is a curious fact that, while *L. venosa*, the home of which is nearest the tropic, endures well the winter of the latitude of San Francisco, *L. insularis*, whose locality is only thirty miles below San Diego, is more tender. Of two specimens of the latter which I brought to flowering here from seeds gathered while on Coronado in 1885, one was killed by frost two years ago, and the other succumbed a year later.

But the main charm of these shrubs is that which they possess in the eye of the student of plant geography. The genus Lavatera belongs to the Mediterranean region of the Old World, where there are perhaps twenty species. There is one in Australia. On the continent of America not one occurs. On a few Pacific coast islands and islets lying at distances of from seven to twenty-five miles from the mainland, we have three, with a fourth on another which lies at a greater distance.

That all these species, even when transferred to the latitude of San Francisco, begin their new growth and exhibit their flower buds about Christmas, comes of the fact that the climate they are all used to is in effect a tropical one. On their respective insular shores they all grow at a little distance from the water line, where the temperature is as mild and equable as possible and where there is never the slightest frost; and there is no island on all the coast whose vegetation does not seem to be about three weeks earlier than that on the adjacent mainland.

The three southerly species here spoken of, as yet almost unknown except to two or three Californian botanists, will be slow in getting into cultivation. The open air climate of San Francisco, even, is rather too severe for them; but on account of their great botanical interest as well as for their singular beauty they are sure to receive further attention.

University of California. *Edward L. Greene.*

Foreign Correspondence.

London Letter.

LILIUMS were the principal feature at the last meeting of the Royal Horticultural Society. Mr. H. J. Elwes delivered an address of exceptional interest, both botanically and horticulturally. As monographer of the genus, and as a cultivator of the plants for many years, Mr. Elwes has special claims to be heard on the subject of their botanical differences and their requirements under cultivation. Whilst few will be found to decry Liliums as ornamental plants, there are

many who find their cultivation difficult. A large proportion of the species are unsatisfactory as a rule, the few cases of their good behavior in the garden being quite exceptional. It may be said with regard to not a few of the species, that we are as yet ignorant of the conditions essential to their permanent welfare in the garden. This is proved in many ways. For instance, we find those who are lucky enough to succeed with the majority of Liliums, declaring that certain given soils and conditions are bound to prove suitable for those plants which others fail to grow. But when these named soils and conditions are carefully provided, even then it often happens that success does not result. Many good gardeners fail with such species as *L. auratum*, *L. Brownii* (*Japonicum*), and even *L. speciosum*. At Kew, where many rare species are a success, *L. candidum*, the glory of thousands of cottagers' gardens in England, is a failure; *L. longiflorum*, too, is far from satisfactory in the open air. On the other hand, *L. auratum* is a giant both in stems and flowers, giving no trouble whatever. Such rare and usually "miffy" species as *L. tenuifolium*, *L. Parryi*, *L. Krameri* and *L. Leichtlini* are equally satisfactory. The commoner species are abundantly represented, and, as a rule, thrive most satisfactorily. This success has not been attained at once, but only after repeated experiments in different parts of the garden and in different soils. The best results are the outcome of planting the bulbs amongst the loose-growing shrubs in deep beds of good soil. Fungoid diseases have given some trouble lately, and it has been suggested that leaf-soil is often the cause. One great bulb-grower in England has convinced himself that leaf-mould, as prepared and used in England, is the curse of the bulb-garden, and has given up its use entirely.

Mr. Elwes, in his monograph published in 1880, recognized fifty-two species of Lilium, almost every one of which has been in cultivation at one time or another. In his address last week he dwelt specially upon the fact that notwithstanding their long cultivation in gardens, and their readiness to produce seeds, yet the number of hybrid Liliums raised is very small. Many have tried to procure hybrids, and some have publicly declared their success, but the only well marked hybrids hitherto raised are *L. Parkmanni*, the result of crossing *L. auratum* and *L. speciosum*, and which was obtained in Massachusetts some twenty years ago. A second hybrid is the offspring of *L. Dalmaticum* and *L. Hansoni*, raised here by Mr. Powell. To these must now be added one called Francis Fell, and exhibited last week by Mr. Ware, of Tottenham. It is the result of crossing *L. Parryi* with *L. pardalinum*. Unless for the purpose of giving vigor and a stronger constitution to some of the weaker kinds, there does not appear much need for hybrid Liliums, the genus presenting an exceptionally wide range of variation in size, form and coloration of flower as well as in habit and season of flowering.

Collections of the flowers of Liliums were exhibited by some of the most noted growers. In addition to the new hybrid already mentioned, Mr. Ware sent flowers of *L. Bolanderi*, a new kind allied to *L. maritimum*, with glaucous leaves in whorls, and small flowers, the segments narrow, reflexed and colored purplish crimson, with blotches of a darker shade. It is a distinct and pretty little plant.

Zinziber D'Arceyi was exhibited as a new plant from the South Sea Islands by the Messrs. Veitch. It has leaves variegated with white and creamy yellow, and promises to be a useful little foliage plant for the stove.

Masdevallia Schræderiana is an attractive little species with fleshy erect leaves and an erect flower-scape. The flowers are an inch across, with three long tails; the upper portion of the segments is purplish in color, the lower part white, edged with purple, the tails being dull yellow. Baron Schroeder obtained a first-class certificate for it.

Cypripedium Youngianum is the produce of *C. superbiens* and *C. Rœbeleni* and is a superior hybrid. Its petals are five inches long and narrow, white with greenish lines and thickly spotted with purple-crimson, the margins fringed; the sepals are of the same color, but flushed with crimson instead of being spotted; the lip is hairy and colored pale brown. It was exhibited by Messrs. F. Sander & Co., and was deservedly awarded a certificate.

Zygopetalum crinito-maxillare is a remarkable hybrid, its parentage denoted by the specific name, and possessed of characters which combine those of its parents. The flowers are about the same size as those of *Z. maxillare*, the sepals and petals deep green spotted with brown, the lip deep violet-blue. It was sent from the gardens of Lord Rothschild and obtained a certificate.

Aërides J'Ansoni is the name given by Mr. Rolfe to a plant lately introduced from Burmah and flowered by Messrs. Hugh Low & Co., of Clapton. It belongs to the group represented by *A. odoratum*, and is in fact merely a variety of that species, viewed in a broad sense. For garden purposes it is, however, sufficiently distinct to merit a name. Mr. Rolfe thinks it may be a natural hybrid between *A. odoratum* and *A. expansum*. It is looser in habit and narrower in leaf than an ordinary *A. odoratum*. The flower segments are tipped and spotted with bright rosy purple, and the spreading lateral lobes of the lip are transversely barred with the same color. The plant flowers freely in a small state and the flowers are decidedly pretty in form and color.

New Late-flowering Hardy Azaleas.—Mr. A. Waterer, of the Knap Hill Nurseries, has succeeded in raising a new race of hardy Azaleas, which promises to be particularly valuable on account of the lateness of its flowering season. In England the flowers of hardy Azaleas generally are over early in June, the latest to flower being *A. occidentalis*, which is sometimes gay with bloom well on into July. By using this as a breeder and crossing it with some of the larger flowered, brighter colored kinds, Mr. Waterer has obtained a number of very handsome seedlings which bloom in July. I have lately mentioned the glorious effect produced in a few gardens here by the flowers of the hardy Azaleas in June. Mr. Waterer has given these plants an additional value by raising a number of late-flowering varieties which will continue the flowering season some weeks beyond the time the older kinds have hitherto lasted.

London. *W. Watson.*

New or Little Known Plants.

Clematis Fremontii.

THIS handsome herbaceous Clematis is the western representative of the rare *Clematis ochroleuca* of the eastern states. It has simple or occasionally branching, pubescent stems a foot or a foot and a half high, with large, crowded, leathery leaves, which are sessile, broadly ovate, entire or few toothed, sparingly villose on the lower surface, with very conspicuously reticulated veinlets. The flower is terminal and nodding, with thick purple, narrowly lanceolate sepals an inch long, with tomentose margins and recurved tips. The pedicel becomes erect in fruit which is composed of silky akenes with short tails naked above and silky at the base. The fruit is handsome, although less showy than that of its eastern congener.

*Clematis Fremontii** was discovered by Frémont on his second expedition, his specimens having, however, no note of locality. The plant was not seen again until 1874, when it was re-discovered by Dr. Louis Watson, near the town of Ellis, in western Kansas. It is now known to grow from Missouri and Kansas to the mountains of Colorado. *Clematis Fremonhi* is very hardy; it is easily raised from seed and may be increased by division. It thrives in ordinary garden soil and flowers during the first days of June.

Our illustration is made from a plant grown in the Arnold Arboretum, where it was sent several years ago from Colorado by Mr. T. S. Brandegee.

New Orchids.

Dendrobium atroviolaceum, Rolfe, is a distinct and beautiful species allied to *D. macrophyllum*, better known in gardens as *D. Veitchianum*, though far superior as a garden plant. The sepals and petals are cream yellow, with numerous purple spots, and the labellum heavily marked with dark violet. It was imported from New Guinea by Messrs. James Veitch & Sons, and was awarded a botanical certificate on April 8th.—*Gardeners' Chronicle*, April 12th, p. 463; and April 26th, p. 512.

Cypripedium × Apollo, Measures. A hybrid raised in the collection of Mr. R. I. Measures, of Camberwell, from *C. Stonei* and *C.* × *vexillarium*, the latter being the pollen parent. It was exhibited on April 22d at a meeting of the Royal Horticultural Society.—*Gardeners' Chronicle*, April 26th, p. 526.

Calanthe rubens, Ridley, is described as a charming novelty, allied to *C. vestita*, but with rose colored flowers. It was discovered by Mr. Curtis in the Langkawi Islands on the west coast of the Malayan Peninsula. Plants are said to have been sent to England.—*Gardeners' Chronicle*, May 10th, p. 576.

Dendrobium × Venus, Rolfe, is a very beautiful hybrid

*Watson, *Proc. Am. Acad.* x, 339.—Watson & Coulter, "Gray's Man. Bot. N. S.," ed. 6, 36.

Fig. 49.—Clematis Fremontii.—See page 380.

raised in the collection of Mr. Norman C. Cookson from *D. Falconeri*, fertilized with the pollen of *D. Nobile*. It approaches *D. Falconeri* in character, though the yellow disc of that species is absent.—*Gardeners' Chronicle*, May 17th, p. 608.

BULBOPHYLLUM LEMNISCATOIDES, Rolfe, is a remarkable species allied to *B. lemniscatum* (*Botanical Magazine*, t. 5961), and like it having three remarkable appendages, one from the back of each sepal. It was introduced by M. van Lansberge, from Java.—*Gardeners' Chronicle*, May 31st, p. 672.

Kew. *R. A. Rolfe.*

Moorea irrorata.—A few weeks ago, Mr. Moore, Curator of the Botanical Gardens at Glasnevin, Dublin, forwarded to Kew an inflorescence and leaves of an Orchid which he had purchased for a Maxillaria at an auction sale, but which differed so much from all Orchids known to him that he suspected it to be something quite new. This view was confirmed by Mr. Rolfe, who has described the plant under the above name. The leaves and pseudo-bulbs resemble those of Houlletia or Xylobium, the former being two feet long by four inches broad, and the latter four and a half inches long and tapering.

The spike springs from the base of the matured pseudo-bulb, and is nearly two feet long, erect, stout, with about a dozen flowers, each two inches in diameter, upon stalks one and a half inches long. The sepals are spreading, half an inch wide, chocolate colored, almost white at the base; the petals are similar, but narrower. The lip is three-lobed, side lobes rounded and thin, front lobe narrow and pointed. The color is bright yellow, with lines of black-purple; column cream-white. The plant is ornamental, and may be compared to some of the Houlletias. The generic name is so far unfortunate in that it resembles Moræa, an African genus of Irids.

Kew. *W.*

Cultural Department.

Notes on American Plants.

THE Ragged Fringed Orchis, which flowers about this time, is not a very showy plant. The lower portion of the flower, which is known as the lip, is divided into many narrow thread-like segments. The flowers are borne in a loose spike about four inches long by a trifle more than an inch thick, and are of a greenish white color. It grows in moist meadows and pastures, also in thickets and bogs. It needs a moist place, and would thrive along the borders of artificial bogs.

Euphorbia corollata is a favorite plant with many who have grown it. Its height is from two to three feet, bearing its small white flowers in umbels. What appears to be the flower is only the five false lobes of the flower. These are white and very fine, the true flowers being inconspicuous. It is a hardy herbaceous perennial, and seems to thrive in any ordinary soil. Though not a troublesome plant, it soon forms strong clumps, spreading from the root.

A pretty Gentian from the Pacific coast is *Gentiana affinis*, but it varies much. The form now in bloom with us is hardly eight inches high, with blue funnel-shaped flowers over an inch in length and five-lobed. On the lower third of these lobes are numerous lighter spots, which add to the beauty of the flower. It seems to thrive well in this climate, but we cannot speak of its hardiness, because our plants were covered with leaves during last winter. A partly shaded location seems to suit it.

Dionæa muscipula, or Venus' Fly-trap, a native of sandy bogs in the Pine Barrens of North and South Carolina, is already too well known to need description. Its curious, sensitive leaves are its chief attraction, and these alone would well repay the trouble of growing it; but the white flowers, which, when grown in our northern climate, appear about the middle of July, are well worth having. It is not a difficult plant to grow if the right soil and situation are selected for it. Wherever a sandy bog can be made in open sunlight it will thrive. Even if this bog be confined to a common flower-pot the plant will thrive, if its natural home is closely copied. It needs protection from our cold winters, and six inches of leaves makes the best covering.

Rhexia Virginica (Deer Grass or Meadow Beauty) comes into bloom about the middle of July. The plant is seldom more than a foot high, bearing showy rose-purple flowers about an inch wide. The large yellow stamens add much to their beauty. It is a native of sandy swamps in Massachusetts, Pennsylvania, Wisconsin and southward. It needs moist, light soil in the sunlight.

Sedum Oreganum, a Stonecrop from the north-west, is quite an acquisition to a collection of this genus. Its thick, leathery leaves are small but very numerous, and have a purplish tinge, which, in a dense bed, give it a fine appearance. The flowers are yellow and in cymes, much resembling those of *S. ternatum* and *S. Nevii*, formerly mentioned, except in color. Of its hardiness we cannot yet speak, but it seems to like our summer climate and a light, loamy soil in the sun.

Perhaps the most variable of our native Lilies in size and the number of its flowers is the Wild Orange Red Lily (*L. Philadelphicum*). It is not rare to find in flower, in the same field, stalks varying from less than a foot in height, with a single diminutive blossom, to five feet high, with as many as six or eight large flowers. The proportion with more than two flowers to the plant is small, and most stems bear only one and two. But often the very small bulbs will send up a short stalk scarcely a foot high, which flowers. It is a native of dry, sandy soil, and when planted in a clay or clay loam does not seem to thrive at all, or, at least, I never have persuaded it to flower in such soil. But in a light loamy soil it is one of the easiest to grow.

During the summer months, almost everywhere, scattered over the bare summits of the higher mountains of northern New England and New York, may be seen in flower the little Mountain Sandwort (*Arenaria Grænlandica*). It is one of our prettiest little alpines, and not a difficult one to grow either by transplanting or from the seed. It is a little, low plant, forming dense tufts of its short, deep green leaves, and from among these, on slender, thread-like stems, scarcely three inches high, are borne the white flowers. These are a third or half of an inch wide. It needs a fine loamy soil, partly shaded, or it may be grown in gravelly soil in a cool place. It will thrive in shaded portions of the rockery. If grown from seed it must be in a fine, light soil, which will not become hard and which has no mixture of clay.

Monarda didyma, commonly called Oswego Tea or Bee Balm, grows much taller in cultivation than in its natural home. In rich garden soil it is frequently four and a half feet high, while two feet is about the height it attains in its wild state. It makes a pretty garden plant, the numerous large scarlet heads being quite conspicuous, and coming out in long succession. It needs full sunlight and ordinary culture.

Cimicifuga racemosa, commonly known as Black Snake-root, grows in rich woods from Maine to Wisconsin and southward. Its stems are from four to eight feet high, bearing at the top two or more long racemes of delicate white flowers. Most of the foliage is below the middle of the stalk. It is easy of culture in either sun or shade, and the long racemes are useful for cutting.

Allium reticulatum, from the western states, is a fine, large species. The stalks are often nearly two feet high, and each bears a large, round, many-flowered umbel of pale purple, or sometimes white, flowers. The flowers are very durable, lasting many days. It thrives in any ordinary soil in the shade, and is perfectly hardy in this climate.

Southwick, Mass. *F. H. Horsford.*

Planting Conifers in August.

THERE is still a deeply-rooted prejudice against August planting. The comment is made, even by nurserymen and old planters, that it can be done, but that it is not practicable except on a limited scale and when the removals are for short distances. It is even said that it is misleading the public to advocate the practice. I need not now reiterate the theory of the comparative rest and maturity of the top of an Evergreen-tree after the middle of August, and, in contrast, the activity of the roots in the warm earth during September and October. It is most interesting to examine the roots of a tree late in the fall which had been moved two or three months previously, and to find how amply it is provided with feeders not only sufficient to sustain it against the exhaustion of the winter, but also to give it vigor for a strong start in the following spring. But, theory aside, I am impelled to state a few more facts in my own experience in addition to those heretofore presented (see Garden and Forest, vol. ii., p. 379), leaving them to have such weight as is due to them.

In the first week of September, 1889, I transplanted a lot of 326 *Picea pungens*, thirty-one Douglas Spruce and six Norway Spruce standing on a lot which I wished to clear and where the soil was considered too heavy for these varieties. The trees would run from two and a half to four feet in height. At the present date I find all the trees in most vigorous growth, with the exception of one *P. pungens*, which is dead. It is not the success in making them live which pleases me, it is the thrift of the trees, which, after an experience of forty years in transplanting, I do not hesitate to say, I never saw equaled in the first year of spring-planted trees. The same can be said of Austrian, Scotch and White Pines, Norway Spruce and Retinosporas transplanted last August. They have made better growth than I ever saw in spring planting.

But the objection is at once raised that all these were for short distances, and that "with special care Evergreen-trees may be moved short distances at any season of the year." Without stopping to show the inadequacy of the objection to meet the facts, I will cite other facts which seem to me to prove clearly that long distances may be successfully overcome. On the 15th of May, 1889, I received from a collector in Colorado 500 *Abies concolor* and 100 Junipers. On the 25th of the same month I received 400 *Picea pungens*. These came in such good condition and looked so promising that I ordered from the same collector in August, 1889, a much larger number. Upon this July 24th, 1890, I have personally examined and assisted in counting the two plantings and now submit the results.

Of the spring-planted 500 *A. concolor*, 190 are living; of the 100 Junipers 70 are living; of the 400 *P. pungens* 310 are living. The August collections were delayed in reaching me and were planted from September 9th until the 19th. Of the 2,800 *P. pungens* 2,332 are now living and 468 are dead. Of the 3,223

A. concolor 2,389 are living and 834 are dead. Of the 500 *Pseudotsuga taxifolia* 355 are living and 145 are dead. It may be thought that this is a large mortality, especially so with the Concolors and Douglas Firs. But, as these are all wild seedlings, a considerable shrinkage is to be expected.

Making the comparisons more definite it may be stated in round numbers as follows: Of spring-planted trees: sixty per cent. of *A. concolor* have died; thirty per cent. of Junipers have died; twenty-three per cent. of the *P. pungens* have died. Of fall-planted trees: twenty-five per cent. of *A. concolor;* twenty-nine per cent. of *P. taxifolia*, and twelve and one-half per cent. of *P. pungens* have died. The above seedlings were of various sizes, from six to ten inches in height. I wish to add, in fairness, that I received from another Colorado collector September 19th, 1889, 1,000 *P. pungens* of a larger size, from one to two feet in height. As might be expected they were more stunted and unpromising. The mortality has been heavy upon this lot, rising above fifty per cent., or, stated more exactly, 527 are dead and 473 alive at this date. For myself I shall continue to advocate the planting of conifers in August and September. For long distances, it is only necessary to guard against heating and drying. Success presupposes care.

Waban Nursery, Newton Highlands, Mass. *Wm. C. Strong.*

View in the Sihlwald.—See page 386.

A Few Strong-growing Adiantums.

THE extensive Maiden-hair family presents much diversity in sizes and forms among its many species, all of which are beautiful, and many of them notably so. It is not intended, however, in this connection to present a catalogue of species, but to invite attention to a few of the stronger growing sorts, many of which flourish under cool-house treatment, or in an ordinary conservatory temperature. Of course all strong-growing Adiantums are not greenhouse sorts, as some of them do much better in a warm-house, but where such varieties are mentioned the average temperature necessary for their well-being will also be noted.

Though the members of this family in general are not specially particular in regard to soil, yet there are a few general rules to be observed—for instance, the soil should be coarse and open, to allow the water to pass through freely, and the pots or pans should invariably be well drained by means of a layer of potsherds, cinders or charcoal. A liberal supply of water should be given during the growing season, and after the plants become somewhat pot-bound an occasional watering with liquid manure will have a good effect, providing it be not used too strong. During the winter somewhat less water will be required and the manure may be entirely omitted, as they make little active growth at that season.

Among the older species, *A. trapeziforme* occupies a prominent place, and is surpassed by few when well grown. It is easy to manage and makes a shapely plant, the leaf-stems being so stiff that they seldom need staking. Its fronds attain a height of from three to four feet, the pinnæ being very large, light green in color and trapezoid in outline. *A. trapeziforme* is of West Indian origin, and has been in cultivation for many years.

A. formosum is another species of special elegance and utility, and is well adapted for cool-house treatment. Its quadripinnate fronds sometimes reach a height of four feet, though they are more often seen two or three feet in height. The pinnæ are much smaller than those of the preceding sort, and the fronds are somewhat stiffer, and are produced from very free-growing rhizomes, the latter being often found coiled around the interior of the pot from top to bottom. It is a native of New Zealand.

A. Peruvianum is an excellent sort of more recent introduction than the above, and, as its name indicates, was first found in Peru. It has long fronds of gracefully arched habit, clothed with very large pinnules of bright, light green, and will make satisfactory progress in a warm house, where its growth in a tem-

perature of sixty to sixty-five degrees will be rapid and strong.

Of course no collection of Ferns is complete without the "Queen of the Maiden-hairs" (*A. Farleyense*), at least no collection that includes warm-house species. This lovely Fern is becoming so widely known that a description seems unnecessary, and for that matter, written description almost invariably fails to do it justice. Suffice it to say that it well deserves the title of Queen, being unrivaled in delicacy, grace and refinement. The origin of *A. Farleyense* has been rather doubtful, though it seems clear that it was first introduced from Barbadoes, and the opinion has been expressed by those qualified to judge, that it really is a cristate form of *A. tenerum*, and it is claimed that seedlings from *A. Farleyense* have reverted to the original type. I have never seen such seedlings; in fact, I can only recollect seeing a fertile frond on *A. Farleyense* on one occasion.

A. Sanctæ Catherinæ is also to be recommended among the strong growers. It is a native of Brazil, and bears some resemblance to *A. trapeziforme*, though rather more compact in growth than the latter, and its young fronds are more noticeable on account of their pleasing bronzy pink tint. When mature its fronds are dark green in color, with shiny black stems, and they average about two feet in height.

A. tenerum is also a desirable species, and seems to be quite widely distributed. It is an evergreen warm-house species, and produces graceful light green fronds from two to four feet in length. The smaller fronds are also valuable for cutting, as they last well in water.

A. cardiochlæna, otherwise known as *A. polyphyllum*, is one of the finest of all when grown as a large specimen, and like most of the large-growing Adiantums it requires plenty of pot-room to develop its full beauty, and also an abundant supply of water at the root. It was introduced from South America a number of years ago, but does not seem to have become very common. It has upright foot-stalks, but drooping fronds, which are of a pleasing light green color, and usually three times divided. These fronds have been known to reach a height of six feet, though this is unusual, and the average is probably from two to three feet.

A. villosum is another fine species from tropical America, and though considered a warm-house plant, may be readily grown in a temperature of fifty-five degrees. It has dark green, bipinnate, glossy fronds about two feet in height, the stems of which are covered with short brown hairs.

Holmesburg, Pa. *W. H. Taplin.*

Rose Notes.

Madame Georges Bruant.—This fine Rose will soon find its way into every good collection. It came through the past two winters in fine style, though many varieties considered absolutely iron-clad have succumbed to the trying extremes of temperature. How it will endure the test of twenty degrees below zero remains to be proved. When its clusters of immense dazzling white flowers open against its profusion of dark foliage it is lovely to behold, and its odor is exquisite. The open rose is very beautiful though only semi-double, for its texture is like satin and its color like driven snow. It seems a pity to note the weak points of a Rose so nearly perfect, but (1) it is liable to mildew when there are very marked changes between the night and day temperature, though not so weak as La France in this respect; and (2) the long, delicately pointed buds are apt to brown on the tips if met by heavy rains followed by a hot sun. It might be called a "Monthly Rose," so regularly does it bloom at intervals during the summer.

Gloire Lyonaise is one of the very finest of the white Hybrid Perpetuals; not a whit behind the aristocratic Merveille de Lyon or White Baroness, while in most situations it proves a hardier and more satisfactory grower than either. The bloom is a rich creamy white, a tint found in no other Rose of its class. It is a beautiful upright grower, with the soft, leather-like foliage of the strong growing Teas. The open flower is very sumptuous in appearance, very lightly scented, but destined to become our most widely grown white Hybrid Perpetual. In common with all hardy Roses, its beauty is liable to be despoiled just as it comes into leaf by the Rose pest; but one or two good doses of hellebore will prevent this, and we have only ourselves to blame if leafless branches or skeletonized foliage meet the eye.

Madame Plantier is an old favorite, which, though small of flower and fine of foliage, should be found in every garden. There are many uses for which this small, perfect white Rose is especially adapted. It comes safely through all kinds of weather and seldom fails to bring a lavish profusion of lovely flowers.

Polyantha Mignonette must become better known. A row forty feet long planted six years ago was a sight to be remembered as it came into a mass of bloom the last of May. To the uninitiated it was a puzzle; it was guessed to be everything but a Rose, until a very close examination of the foliage settled the question. Rosy pink and white were the great armfuls of fairy roses, the single flowers an inch in diameter and in clusters of forty and fifty. It blooms very perfectly until hot weather sets in, when the roses blight in the bud unless a good part of each cluster is pruned away. We may safely look to this section for some splendid acquisitions for the hardy Rose bed.

The Moss Roses were, many of them, a disappointment, as they all showed a tendency to open in a one-sided fashion and without apparent cause, except our grand old friend Cristata, which was in superb condition. The long buds of heavy green moss opened slowly and perfectly to show a splendid double rose of brightest pink, with that peculiar odor which, once inhaled, can never be forgotten.

It seems a great pity that many of the best Mosses, some of the finest Hybrid Perpetuals and the Austrian Roses should be of such difficult propagation as to make it next to impossible to secure them on their own roots. Perhaps the florist of the future will find a means of rooting them more readily, when we may hope to find them more generally distributed through American gardens; for the American amateur insists on having "own-root" plants, and, generally speaking, he is right, for it is a fact that many grafted plants, that should have been in their prime in 1890, were weakened by the freezings and thawings of the winter of 1888–1889, to be killed outright by the severe cold of the past March following a warm February.

Richmond, Ind. *E. G. Hill.*

The Brazilian Miltonias.

THE Brazilian species of Miltonia are not so generally grown in amateur collections as their beauty warrants. Nevertheless they are very desirable, growing freely and always flowering well under proper care. They have the good quality, too, of flowering at a dull time of year, usually during the months of August, September and October, when their large, conspicuous flowers are very attractive, and they remain in good condition for several weeks. These Miltonias can be grown in a shady corner of the Cattleya-house, where it is possible to shade them at all times from the direct sunlight. They should be grown in pots filled to within two inches of the rim with broken potsherds, over which is placed a layer of fresh sphagnum to keep the potting material from the drainage. Equal parts of peat and live sphagnum moss suit them admirably. Care must be taken to elevate them well above the pot and not to bury the rhizome. While growing they require a constant supply of water, and at no time of the year must they be allowed to get dry. Syringing overhead morning and evening is beneficial to them while growing. The following species are those most generally found in cultivation and usually prove the easiest to manage:

M. cuneata, with flowers borne on spikes, several together; the sepals and petals a rather dark shade of brown tipped with pale yellow, the lip white.

M. candida, a very pretty species, bearing many brown, yellow and white flowers on each spike, one of the strongest growers of the genus. Its variety, Grandiflora, is a decided improvement, having larger and much brighter flowers.

M. Clowesii, var. *major*, another strong grower producing long spikes freely, with flowers of good size. The sepals and petals are primrose yellow, the ends of which are barred with rich brown; the lip is white, suffused with purple.

M. Morelliana, and its variety Atrorubens, decidedly pretty plants, not so tall as those named above, but having larger and more attractive flowers. *M. Morelliana* has sepals and petals of rich, rosy purple, while the very broad lip is pale rose with veins of a deeper hue. The variety Atrorubens is much richer in color in all parts, but is rather a rare plant.

M. Regnellii, with flowers on long spikes, sepals and petals milk white, with a rosy colored lip. There is a distinct and superior variety, Purpurea, with sepals and petals rosy white, and the lip a splendid purplish crimson.

M. spectabilis, small, but with extra large flowers, having sepals and petals pure white and the broad lip pale rosy white, streaked with violet-purple. This is perhaps the most variable of the Brazilian Miltonias, and one of the best.

Many growers grow *M. spectabilis*, and *M. Morelliana*, which is really one of its varieties, on blocks of Tree Fern placed in pots, but they rarely do as well when their small, wiry roots are exposed to atmospheric changes and especially to dry air.

Easton, Pa. *H. Clinkaberry.*

Herbaceous Pæonies.

THE flowering season just over has been one of the best I remember for Pæonies. A large bed of named varieties was a fine sight for the two or three weeks during which it was at its best. These plants revel in well manured soil, and, although they are impatient of removal, the manure may be lightly dug in without causing them any injury. If it is wished to move or divide any established plants, it should be borne in mind that they will not flower satisfactorily the first year after removal, but with generous treatment this will be the extent of the loss. Care should be taken in the selection of sorts, only the most robust being suitable for growing in prominent positions. There are some kinds which appear to have a tendency to develop a great number of small crowns that are useless for flowering, and these are very disappointing, for it seems almost impossible to induce them to make really satisfactory growth, and, at most, one or two flowers on a plant are all they will produce. All such kinds are ineffective in a flower-garden. The old *P. officinalis* is very useful for planting in rough places amongst the Grass or as a fringe to the shrubbery, for it does remarkably well when let alone after it gets established. None of the named kinds I have seen can compare with it for this sort of work.

I append a list, selected from about thirty named sorts, which have been exceptionally good here the past season:

Candidissima.—Pure white guard-petals, pale primrose centre.

Carnea grandiflora.—Delicate blush, changing to pure white, incurved flower, very strong and good.

Charles Binder.—Deep rose, very full flower, scented.

Constance Devred.—Deep carmine, large flowers.

Dr. Calot.—Deep rose guard-petals, centre salmon.

Festiva maxima.—Pure white, incurved, stained carmine on centre petals, strong grower, magnificent.

Isabella Karlitzky.—Carmine-rose, full centre, very fine, scented.

Louis van Houtte.—Bright, purple-lake, strong grower, very large flowers, Hawthorn scented.

Marie Dhour.—Pale flesh color, full centre, dwarf, fine and free, scented.

Mme. Muyssaert.—Bright rose, light centre.

Mme. Jules Calot.—Bright rose, chamois-yellow centre, scented.

Paul Rubourg.—Rose, very double, late, strong and good.

Rosamond.—Rose, incurved, strong grower, very fine flower, scented.

Rubra triumphans.—Deep crimson, incurved, strong grower.

Whitleyi.—Single, pure white, large ball of golden anthers, dwarf, free, and the earliest of the section.

J. C. Tallack, in *The Garden.*

Disa tripetaloides is a beautiful little species which has lately attracted much attention and even admiration from members of the Orchid-loving community, and it is probable that it will soon become tolerably well known, for it has features which will readily recommend it, viz.: the ease with which it may be grown, the length of time its flowers remain in perfection, and their quiet and charming character—so different from that of the Grandiflora section. Flowering specimens have been exhibited during May and June in London. The leaves are lanceolate-acute, deep glossy green, somewhat fleshy in texture, three to four inches long and about half an inch broad in the widest portion. They are clustered at the base, but pass up the scape, which springs from the centre alternately, and change into green bracts. The erect scape is from nine inches to a foot high, and bears as many as twenty to thirty flowers, each of which is about three-quarters of an inch across, and of a beautifully soft, very pale lilac, handsomely speckled with deep rose. The upper sepal reminds one of a monk's cowl with a short, conical spur at the back. The lateral sepals are, in comparison, much larger, elliptic-oblong, while the small falcate petals and linear lip are within the precincts of the upper sepal and require close inspection to make them distinguishable.

This species, although now brought prominently before the public, is by no means new, having, according to Mr. N. E. Brown, of the Kew Herbarium, been discovered over a hundred years ago in South Africa by the traveler Thunberg, and named *Orchis tripetaloides* by the younger Linnæus. Thunberg afterward confused it with his own *D. excelsa*, and Dr. Lindley thought it to be *D. venosa* of Swartz, a plant whose identity has been mixed up with *D. racemosa*. To make matters clear Mr. Brown therefore retained the specific name given by Linnæus the younger, and re-named it *Disa tripetaloides*.

Those who are in the habit of looking at every Orchid as requiring "heat and moisture" will perhaps be agreeably surprised to learn that the subject of this note is a cool-growing and even hardy species. Mr. James O'Brien, of Harrow-on-the-Hill, to whom its re-introduction to cultivation is due, has grown his plants in pans in a cold frame, where they have freely flowered—some of them having even been subjected to frost. It is evident from these facts that *Disa tripetaloides* should grow well in a cool house, without requiring so much attention as some of its larger flowered congeners.

London. *John Weathers.*

Kniphofia (Tritoma) Saundersii.—One of the most pleasing and brightest things in the garden lately has been this beautiful Torch Flower. With its deep green, angular, rush-like foliage, and massive stems surmounted by the long spike of brilliant flowers, this is one of the most noble of plants. A well grown clump would be an attraction in the best of gardens. The flowers of this variety are a very pleasing orange-red, shading into orange. They are individually of good size, the spike being a foot or more long. Unfortunately, the plant is not entirely hardy here, needing careful protection from frost and wet, but well worth any amount of trouble.

Chrysanthemum maximum.—A trade circular just received, in which this is included as a choice perennial, leads me to say that it is a weed, or, in other words, a plant not worth a place in the garden. For three years I have been trying it without discovering other merits than its neat, vigorous habit. The flowers, under ordinary cultivation, are little larger than those of a well grown field Daisy, but perhaps if well fertilized they might be half an inch broader. The white Daisies are beautiful in the meadows, but, with their present abundance, it does not seem worth while even to give a slightly better variety room in the garden. Fortunately, *C. maximum* does not seem as hardy as the common White Weed. Some few years ago some seed from Vilmorin produced flowers with a tendency to doubling, and I notice a similar variety offered as *C. semi-duplex*. It is perhaps unnecessary to say that such flowers are abominations. If White Daisies of good size are desired early in the year, it would seem that the single Hybrid Pyrethrums are altogether the most useful and handsomest, both in flower and foliage. In a good strain of mixed seed some fine white ones will usually be found as well as the ordinary reds.

Elizabeth, N. J. *G.*

Plant Notes.

Papaver Californicum.

THIS true Poppy, the only one indigenous to California, was discovered in 1886 in the Santa Inez Mountains by Mr. John Spence, of Santa Barbara. It was described by Dr. Asa Gray in the *Proceedings of the American Academy of Arts and Sciences*, vol. xxii., pp. 313-314, thus being one of the last California flowers to receive a name at the hands of that illustrious botanist. Not only is it one of the latest discoveries, but it justly ranks among the handsomest of the annuals of the Pacific coast.

It is rarely found except on ground which has been burnt over, Mr. Spence first finding it far away from any cultivated fields at an elevation of 1,500 to 2,000 feet, on ground which had been covered principally with Manzanita bushes, but had been burned over the year before. Probably for this reason, and from its close resemblance in appearance to *Meconopsis heterophylla*, a less showy plant, but with flowers almost identical in size and coloring, it owes its escape from previous discovery.

As Dr. Gray suspected, this is not a local species, but is apparently widely distributed in southern California, having recently been collected by several botanists in widely separated localities, but everywhere under similar conditions as first found—on tracts of burnt brush-lands at from one to two thousand feet elevation. This spring I observed it in great abundance back of San Diego, near Potrero, and also between the Cajon and Santa Maria valleys, on hill-sides burned over by forest or brush fires last fall. Although I have traversed both sections repeatedly during the past ten years this richly colored flower had never been seen before these fires had denuded the land.

It forms a fine, bushy plant about a foot in height and bears a profusion of large, showy flowers of an average of two inches in diameter. The color of the large, delicate petals is a bright, saturn red to orange chrome, with a centre of a delicate sulphur yellow. In cultivation it is said to make a fine pot-plant, and if it improves as most of our wild flowers do under the attention of horticulturists, it will prove a most desirable addition to American gardens.

Associated with it is usually found *Phacelia Orcuttiana*, another so-called "fire weed" which is likely to prove a welcome acquisition to the garden on account of its masses of white flowers with conspicuous yellow centres. This Phacelia grows into a tall, stately plant, branching freely from the base.

It is an interesting problem why the seeds of these handsome plants should lie dormant so many years in the soil, awaiting the—to them—life-saving, destructive fire. After once starting into existence the seed does not seem to require to pass through the ordeal of fire before growing, for the second year after a fire they appear in greater abundance than the first. Gradually, however, as other plants get re-established on the ground these become fewer and fewer, until other vegetation overcomes them, and their seeds again lie dormant in the soil awaiting another deluge of flame.

San Diego, Cal. *C. R. Orcutt.*

CLEMATIS MONTANA.—A charming picture of a porch covered with this climber, in a recent issue of *The Garden*, of London, reminds us that the plant, although very rarely seen in gardens in this country, is perfectly hardy here, and that it is one of the very best of the early-blooming vines. Splendid shoots wreathed with the clusters of large white flowers were shown a month ago at one of the weekly exhibitions of the Massachusetts Horticultural Society by Mr. Joseph Clark, gardener of Henry L. Higginson, of Manchester, Massachusetts. *Clematis montana* is a native of Nepaul, whence it was introduced into English gardens as long ago as 1831. It is a rampant grower, producing, if the plant is severely pruned immediately after it has done flowering, shoots sometimes six or eight feet long, which flower the following year from end to end. As the writer in *The Garden* says, "its early blooming character, fitness for all ordinary soils, and complete hardiness, save in very cold spots, have raised it to the position it holds in the garden. It must be a poor place that has not rambling over a veranda, trellis, arch or wall *Clematis montana*." The specimen forming the subject of *The Garden* illustration has been planted for over thirty years in its present position, blooming freely every year, and covering the whole front of a house. It is planted in a border close to the wall and obtains little surface water. It is cut back once or twice a year.

The Forest.

The Sihlwald.—II.

IN the organization of a normally stocked forest the object of first importance is the cutting each year of an amount of timber equal to the total annual increase over the whole area, and no more. If is further desirable in any long settled community that the forests be so managed as to yield a measurably constant return in material. Otherwise difficulties in the supply of labor and the disposal of the produce make themselves felt, and the value of the forest to its owner tends to decrease. This is especially true in the case of the Sihlwald, whose mills derive their raw material exclusively from the forest to which they belong, and whose supply of labor is limited to the men whom it furnishes with steady employment. Either excess or deficit in the annual production implies loss.

In order to attain this steadiness of yield it is obviously necessary that a certain number of trees become fit to cut each year. The Sihlwald has accordingly been so "organized" that areas of equal productive capacity are covered by stocks of every age, from last year's seedling to the mature tree. These age-gradations succeed each other in a series so regular that in an hour's walk one may pass from the lot just cut over through a forest of steadily increasing age to the trees which have reached the limit of the rotation of ninety years. Three such units of organization are present in the Sihlwald, but since the character of the Fraumunsterforst, as the forest on the right bank of the Sihl is called, separates it distinctly from the much greater area of the Sihlwald proper, and since the two divisions of this last differ only in unessential matters over which the treatment has no control, it will be necessary to speak of only one of them. The working plan for the Lower Sihlwald, then, prescribes for the forest which it controls the operations of what Dr. Schlich has called in his *Manual of Forestry* "The Shelter-wood Compartment System." It may not be without interest to follow the life history of a compartment in which this system is carried out.

After the mature trees had been felled and removed from the area which furnished the yield of the Lower Sihlwald last year the thick crop of seedlings which had grown up under their shelter was finally exposed to the full influence of the light and air. The felling and rough shaping of the timber, the piling of logs and cord-wood and the trampling of the men had combined with the crisis of exposure to destroy the new crop in places and create a few small blanks. Here, as soon as the disappearance of the snow had made it possible, groups of the kinds of seedlings necessary to preserve the mixture or destined to increase the proportion of the more valuable species were planted. The operation, necessarily an expensive one, is justified by the greater resistance of a mixed forest to nearly all the calamities which may befall standing timber. Simultaneously with the planting the Willows, Hazels and other worthless species were destroyed, as well as the "pre-existing seedlings," whose larger growth, according to the disputed theory held at the Sihlwald, would damage their younger neighbors more by their shade than their greater volume would increase the final yield of timber. The incipient forest, then, practically uniform in age and size and broken by no blanks which the growth of a year or two will not conceal, is fairly started on the course of healthy development, which it is to continue undisturbed until it reaches the age of fifteen years.

At this point occurs the first of a series of thinnings which follow each other at intervals of seven or eight years, until the trees have entered the last third of their existence. There is, perhaps, no silvicultural question more in dispute than this of the time and degree of thinning which will yield the best results in quality and quantity of timber. The method pursued at the Sihlwald, consecrated by habit and success, gives ample space for the healthy development of the crown from a very early age without admitting light enough through the leaf-canopy to sustain an undergrowth until the trees are nearly ready to give place to their descendants. Such shrubs or seedlings as still appear, thanks to a shade-bearing temperament, are systematically cut out. It may be strongly doubted whether such a policy might safely be applied on soil less moist than that of the Sihlwald; but here, at least, the trees reach the age of sixty years, tall, straight, clean-boled, and in condition to make the best of the last part of the period of maximum growth, which a large number of measurements have shown to occur in general between the ages of seventy and ninety years. A heavy thinning now comes to the assistance of the best specimens of growth, and they are left to profit by it until seven years before the date fixed for their fall. Then begin the regeneration cuttings, whose object is to admit through the leaf-canopy an amount of light, varying with the temperament of each species, whose mission is to give vitality to the seedlings which the trees, stimulated themselves by their more favorable situation, now begin to produce in considerable quantities. To this end the light which falls from above has a powerful auxiliary in that which the system of felling each year in a long, narrow strip admits from the side, and so admirable is this double method that the time which elapses between the beginning and the end of a regeneration is but half the average for less favored localities. This applies only to the deciduous trees. The time required by the conifers is much longer, and the incomplete regeneration which they furnish is supplemented by planting in the blanks already mentioned. But for the self-sown seedlings of both classes the amount of light is gradually increased, the trees which sheltered them are at length wholly removed, and the cycle of growth repeats itself.

The wagon roads which once served for the transportation of the timber thus produced, although admirable in plan and construction and still thoroughly maintained, have been almost wholly superseded by a system of timber slides and narrow gauge railroads, in which gravity is the motive power. The timber, loaded directly on the cars of the light, portable track laid in the forest (see page 383), or, where the surface is broken, hauled to them by tough little Swiss oxen or carried down on hand sleds which are capable of taking enormous loads, is delivered at the head of one of the slides. Thrown in at the top of the V or U-shaped canal of boards or poles, it rushes down the steep incline of the slide with a speed which often shoots the sticks of cord-wood through the air for a distance of one hundred and fifty feet as they rebound from the iron-clad platform at the foot, and not infrequently tears apart great logs in the violence of the fall. Piled once more on the cars, this time of one of the two permanent tracks which follow the bottom of the valley at divergent levels, the timber pursues more quietly its journey to the mill, whither it arrives in trains of from five to twenty cars under the guidance of a single brakeman. Such a system of transportation is only possible where considerable amounts of timber are cut on limited areas, but its application to the Sihlwald has resulted in so steady and marked a decrease in the cost of moving the produce of the forest to the mills that its value under similar circumstances may be taken to be proved.

Nancy, France. *Gifford Pinchot.*

Correspondence.

Our Schools and Gardening.

To the Editor of GARDEN AND FOREST:

Sir.—I have lately had occasion to discuss elsewhere the subject of our common school education as bearing on rural life, horticulture and farming. This was recalled to me by an editorial recently in GARDEN AND FOREST on horticultural education. Agricultural colleges are of value in their way; but they are too far along and their influence is exercised too late. A boy, graduate of our common schools and sent to an agricultural college, goes charged with a popular bias in favor of trade. It is a simple fact that commerce in any form is held to be honorable, but land-tillage is looked down upon. My friend Parker can retail my potatoes, peas and berries, but the raiser of vegetables and berries for market, and the first sale of the same, brands one as belonging to a lower caste. It needs considerable decision to get on a load of cabbages and take them to market. Now, I have learned to trace this error in public judgment to a foundation or causal error in education. The trouble in this case is that our schools are in no sense whatever adjusted to farm life and farm work. "Any one can be a farmer. It needs no special education to grow onions." This is the public sentiment that must be corrected, and with it the false methods of study. There will be no demand for higher education in horticulture or agriculture until pupils are started in the right direction in the common schools.

A man who sends his boy to school with the direct purpose of qualifying him to comprehend and love the things which come under his eye and other senses, and in order to enable him to enter into sympathy with his work in the field, will be disappointed. The horticulturist needs to understand vegetable and animal life—their history and evolution, the possibilities involved in climatic and other environments—and should be prepared for the comparative and experimental cultivation of plants, trees and animals. Will the curriculum of the common school prepare the boy or the girl in these directions? Out of this they get neither botany nor zoology; neither horticulture nor gardening in the narrower sense; neither a knowledge of soils, nor of rocks, nor of vegetable chemistry. What is given to the child is more specifically that which inclines him to trade, and away from land culture. It will not do to rely on a higher training after the bias is given. The suggestive plan proposed by GARDEN AND FOREST and by Professor Bailey, covers the advanced need of a pupil already under way with elementary biology. But until our schools specifically recognize, from the outset, the dignity of gardening and field work, education will unfit, rather than fit, us for being an agricultural people.

I am persistent in beginning with all my children at a knowledge of soils and rocks, the land under their feet, and its make-up geologically. Then I pass on to the life on the earth—vegetable and animal. So long as I can find an elementary book like that of Professor Shaler there is no trouble with geology. As for zoology and botany we are also fairly well supplied with good books. Chemistry in laboratory work follows. And so the lads from ten to twelve years of age have a knowledge first of all of the world about them and the life on it. It is mostly field work and laboratory work; and with it goes drawing, from the outset. Such a course gives them a passion for the soil and plants and animals, from the beginning of their mental development. I may add that they never think of such studies as tasks, but as enthusiasms. I do not advocate directing a boy to land culture when he has a marked taste for machinery or for literature; but the retention by wise and fitting education of those who naturally should be farmers and gardeners.

Clinton, N. Y. *E. P. Powell.*

Bermuda Grass.

To the Editor of GARDEN AND FOREST:

Sir.—The grass on the lawn of your correspondent at Frankfort, Kentucky, "making a growth all through June," is doubtless the Bermuda Grass (*Cynodon Dactylon*), as you have determined it; but it is not usual to find it troublesome where other lawn grasses will grow, and this experience with it in Frankfort is very interesting. The foliage of this grass is so easily killed by frost that it does not seem able to gain a foothold north of the Potomac. Botanical works give its range as from Pennsylvania southwardly; but I have never been able to find a specimen except in the ballast ground near Philadelphia, where it occasionally springs up from the seeds brought in the ballast, but does not spread beyond. In the admirable list of the "Flora of New Jersey," from the pen of Dr. Britton, just published as part of the work of the Geological Survey, it is noted only in a few instances on wharves or in ballast heaps.

That it rarely seeds in the United States is, I think, a popular error. It flowers rather early, and before its later creeping habit begins. In that state it attracts popular attention, and there no seed vessels are seen. Years ago, when examining the horticulture and agriculture of Louisiana and Mississippi, Colonel Hillyard, now of New Orleans, remarked to me on one occasion near New Orleans, "They say this never seeds. Look, it is abundantly seeding here." Again, some years later, I was crossing the then unfinished grounds in front of the new National Museum at Washington with Professor Porter, of Easton, who called my attention to the abundant fruiting of the grass on that waste ground. A specimen that I gathered there I subsequently sent to Doctor Thurber, who had given currency to the non-seeding reputation of the Grass.

The "dwarfed, late-starting Grass of the northern states, so destructive to northern lawns" (page 363) is probably *Panicum sanguinale*.

Germantown, Pa. *Thomas Meehan.*

Recent Publications.

Les Champignons, Traité élémentaire et pratique de Mycologie suivi de la Description des Espèces utiles, dangereuses, remarquables. Par J. Moyen avec une Introduction par Jules De Seynes. Paris: J. Rothschild. Pp. xxxv., 762, 20 chromo-lithographs and 334 wood-cuts.

The French certainly understand the art of making popular treatises on natural history. To artistic skill in the production of plates they generally add a style which, although approaching diffuseness, is clear and easily followed. The present work, in spite of its 800 pages, is so well arranged that the reader can easily find what he wants to know and read it quickly. It is one of a class of books of which a considerable number have appeared in the last few years whose object is to give to the unscientific, or mildly scientific, reader a general view of the forms and properties of all kinds of fungi and a more detailed knowledge of the species which are edible or poisonous. It contains a large amount of information, and we do not know any better elementary work of the same scope. The numerous wood-cuts are a great help to the beginner who wishes to study the subject from a botanical point of view, and the amateur who is only in search of some ready means of recognizing the principal edible and poisonous forms will find the colored plates a practical aid. The larger part of the text is devoted to a "Flore Mycologique," or description of the most important *Basidiomycetes* and the larger *Ascomycetes*, followed by an artificial key to the species and a glossary of technical terms. The medical man would perhaps prefer the work of L. M. Gautier, *Les Champignons*, and the expert mycologist would require more technical works, but the present book is to be recommended to those general readers and amateurs who desire to begin the study of fungi, for it offers in a condensed and simple form the substance of a good many books. The reader may perhaps feel that too much is given, but that error, if it be an error, is one easily pardoned.

Notes.

California nectarines are in the market, and very good they are. Some of the California peaches, too, are fair, and there are few others to be had in the city. Jamaica oranges are just coming.

In an article on the "Botanic Gardens at Kew," recently published in the *Popular Science Monthly*, it is said that between six and seven hundred thousand persons visit them in the course of a year.

It is reported in the *American Agriculturist* that a rust has appeared on the Canada Thistle. The fungus spreads rapidly and is very destructive of the host plant, which is well known as one of the most pestilent of weeds.

We are advised that Hill & Co., proprietors of the Rose Nursery at Richmond, Indiana, have retired from the retail business. Hereafter the Messrs. Hill, in a new location not far from the city, will limit themselves to a wholesale and novelty trade.

Clethra barbinervis, obtained from Japan through Mr. Thomas Hogg in 1875, is now in bloom at the Kissena Nurseries, Flushing, and a very striking shrub it is. It is a strong grower, with leaves six and a half inches long and three inches wide on leaf stems one inch long. The flowers are pure waxy white, with white pistil and stamens, and they are arranged in racemes six

inches long. The plant is specially valuable because it blooms when few shrubs are in flower. Mr. Parsons reports that it is sometimes affected slightly by the winter.

The proceedings at the fifteenth annual meeting of the American Association of Nurserymen, held in this city last June, have been promptly published in a neat volume of 100 pages, with a portrait of the President for the coming year, Hon. S. M. Emery, of Minnesota.

An exhibition of jams, bottled, preserved and dried fruits of all kinds, is to be held in London under the direction of the Royal Horticultural Society, on the 14th, 15th and 16th days of October next. The chief object of the exhibition will be to show the advance which has been made during recent years in processes of preserving and drying edible fruits for consumption. For the schedule of premiums and other information application should be made to the Secretary of the Royal Horticultural Society, 117 Victoria Street, London, S. W.

The American Forestry Association has accepted the kind invitation of the Government of the Province of Quebec to hold its annual meeting in the Parliament Buildings, Quebec, from the 2d to the 5th day of September. While the conditions under which the Association will meet are a guarantee for earnest and useful work in the cause of forestry, the historical city of Quebec, with its beautiful surroundings, will also help to secure a large attendance. All persons who intend to read papers at the meeting are requested to send the title to the First Vice-President, Honorable H. G. Joly, 15 Buade Street, Quebec, before the 15th of August.

Captain Hayward is the name of another finely colored and scented new Hybrid Perpetual Rose, sent out by Mr. Henry Bennett, of Shepperton, and a correspondent of *The* (London) *Garden* speaks of it as a valuable addition to a long list of good things this raiser has produced. The flowers are very showy, and remind one when fully expanded of those of Ulrich Brunner, but they are quite distinct. Their color is rich crimson, shaded with a bluish tone when open, while the scent is strong and rich. The vigor of the bloom and stem indicates unusual robustness in the plant, and if this proves true then we have a welcome Rose of fine, bold character for the garden.

Different Kœlreuteria-trees vary considerably in their time of coming into bloom. This year we observed one in full flower on the fourth of July and near it is another which is still in flower. The trees vary greatly also in the appearance of their fruit, which stands out above the foliage in large spreading, bladdery panicles. In some the color is a very soft, light yellowish green, while in others even at their earliest appearance the color is a rich reddish bronze. The Kœlreuteria is one of the most interesting of small trees at all seasons. Its foliage is abundant and healthy, and rarely visited by destructive insects. The great panicles of bright yellow flowers make it a striking object when in bloom, and the fruit, until it dries up and turns brown, also adds to its effectiveness.

The carelessness with which writers in popular journals speak of trees was shown in a recent number of the Pall Mall *Gazette*, when the fabled "World-tree," believed in by northern nations in Pagan times, is spoken of. New Yorkers have had a picture of this "World-tree" put before them of late in Wagner's opera, where Siegmund draws from its giant trunk the enchanted sword, and many will recollect that in the text it is called an Ash—*Esche*. Such in fact it was thought to be, and it is well known that the Ash, like the Oak, long retained its sacred character among the Germans even after they were christianized. Yet the writer referred to calls the "World-tree" a "Mountain Ash." This does not mean an Ash at all, as every one should know, for the tree is common everywhere in cultivation, but a tree of another family altogether, one which never grows to large dimensions and belongs in the same genus with the Apple and Pear.

The people of Florida believe that there is a prosperous future for the Pomelo as a summer fruit. This fruit varies in acidity. In most varieties the acid becomes agreeably mild in May, but in many instances it remains strong until midsummer, so that by proper selection and management good fruit can undoubtedly be had all through the hot season. In the middle of July some fine fruit appeared in the Jacksonville market and sold there at ten cents apiece. The Lakeland *Advocate* quotes returns for seven boxes of bright Grape-Fruit in good condition, each box about the size of an ordinary orange-box and holding some fifty fruits, and they netted the grower more than eight cents apiece. This is said to be the highest wholesale price yet received, but certainly it is not more than the real value of the fruit, which many people consider superior to the orange. It should be eaten so as to avoid the bitter flavor of the peel and the core, the best method of preparing it being to peel the fruit first and then carefully to separate the pulp from the remaining integuments.

Quoting from an Italian journal a writer in the *Bulletin of the Torrey Botanical Club* for July says with regard to the naturalization of American plants in France: "In 1881 on the banks of the Meurthe, near Nancy, a few specimens of *Lepidium Virginicum* (Wild Peppergrass) were found among growths of *Lepidium ruderale* (a European species which is sparingly adventive in this country), and two other adventive American plants, a Gilia and *Amsinckia lycopsioides*. They lasted about ten years and disappeared along with the manufactory of flannel shirts, to which they probably owed their origin in that place, as the wool used in the looms (presumably brought from Chili) was cleaned in the river and spread on its pebbly banks to dry. *Lepidium Virginicum* disappeared with the rest of the foreigners, but several years later was found again near Nancy, and, with *Poa pœoides* and *Salvia verticillata*, is spreading along the railroads. *Œnothera biennis* and *Œ. muricata* are adventive on the banks of the Moselle and abundant there," while the same Peppergrass, which has been so persistent at Nancy, has been known for forty years in one spot at Bayonne, and has spread through the departments of Landes and Basses Pyrénées, "where it is now abundant in waste places and along railroads."

The State Analyst of New York State having recently been requested by the Secretary of the State Board of Health to give his opinion with regard to the wholesomeness of cotton-seed oil and of lard and lard compounds into which this oil enters as a component part, has replied as follows: "I am clearly of the opinion that cotton-seed oil, whether used alone or commingled with other oils or fats, is a perfectly wholesome and nutritious food, and as easily digested and assimilated as any of the commonly employed fats. In support of this view the opinion of numberless writers upon the subject and of experts in chemistry and physiology might be adduced. Throughout the cotton-growing states it has been for a long time very largely used, and the medical faculty of the Arkansas University say that it is to be preferred to other fats in many respects, 'agreeing with the most delicate stomachs, whether used in baking or frying,' and that 'not one instance has ever been given of health being in any manner impaired by the use, however free, of cotton-seed oil in food.' They say that 'thousands of hands employed in the cotton-seed oil mills are in the habit of making their dinners on the crude oil by dipping their bread in it, and some of them actually drink it, and yet from this free use of it nothing has ever resulted but the best of health.'"

Professor B. D. Halsted in an article entitled "Observations on the Doubling of Flowers," published in the *Popular Science Monthly* for July, cites this instance of a doubling process. "In the Petunia the doubling of the flower is usually accompanied by a remarkable modification of the pistil—in short, a secondary flower is formed within the ovary. Botanists have long recognized an exceptional development of the floral axis which has been termed prolification. In this there may be a prolongation of the axis beyond the blossom, and the development upon it of ordinary foliage. The European Larch furnishes a good illustration of this. Sometimes an ordinary leafy stem extends upward from the centre of the cone for nearly a foot. In rare cases leafy branches have grown out from the free or blossom end of pears, and buds and long branches have arisen from the centre of a rose. In the Petunia this prolification, if we may call it such, assumes the form of a small and much contorted flower. Repeated examinations of normal flowers fail to show any unusual structure to the pistil. It is, therefore, associated with the doubling process in the Petunia. Instead of the end of the floral axis, which terminates at the base of the single centrally situated pistil, remaining as such, it develops into another flower, and this within the ovary of the primary blossom. Just why we should have this peculiar form of prolification, or any, in fact, is not for us to decide. The ordinary forces which would construct a normal flower have been thrown into confusion, and retrograde metamorphoses and floral prolification have resulted. In fact, it seems evident that out of the substance ordinarily producing a capsule of Petunia-seed has been formed in the same ovary an amalgamation of stamens, petals, and a rudimentary pistil. In short, the tendency to petaline display does not stop with the stamens, but invades the pistil, and transforms it as already described."